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DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380

IN REPLY REFER TO
ROC-3-22-avs
7 APR 1983

From: Commandant of the Marine Corps
To: Distribution List

Subj: Required Operational Capability (ROC) No. LOG 1.63 for the Trailer Mounted Mine Clearing Line Charge (MICLIC) System

Ref: (a) MCO 3900.4B

Encl: (1) ROC No. LOG 1.63 for the Trailer Mounted Mine Clearing Line Charge (MICLIC) System

1. This letter establishes and promulgates ROC No. LOG 1.63 for the Trailer Mounted Mine Clearing Line [illegible]e (MICLIC) System. The ROC has been developed in accord[illegible] the reference and is contained in the enclosure.

2. The Commanding General, Mari[illegible]rps Development and Education Command (Director, De[illegible]ment Center) is the Marine Corps point of contact for the [illegible]elopment efforts pertaining to the MICLIC.

Eugene B. Russell

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REQUIRED OPERATIONAL CAPABILITY (ROC) NO. LOG 1.63

FOR THE

TRAILER MOUNTED MINE CLEARING LINE CHARGE (MICLIC) SYSTEM

1. STATEMENT OF NEED. The U.S. Marine Corps requires an easily transportable, rapidly deployable mine clearing capability which can be employed without modification or permanent attachment to tactical wheeled and tracked vehicles. A trailer mounted mine clearing line charge would provide a surface-launched capability which could be rapidly employed by mechanized infantry, armored and combat engineer units. A MICLIC system is needed to create a vehicle-width cleared lane for tracked and wheeled vehicles through minefield obstacles. A MICLIC system would provide a highly mobile, simple and quick response capability for enhanced tactical mobility. The Initial Operational Capability (IOC) should be FY85.

2. THREAT AND OPERATIONAL DEFICIENCY

a. Threat. Potential enemy threats confronting the United States in the near- to long-range period are fully developed in the United States Marine Corps Long-Range Plan (MLRP) and the United States Marine Corps Midrange Objectives Plan (MMROP).

(1) The threat makes extensive use of mines in all operations. To support its use of mines, the threat has continued to improve its mine warfare capabilities through materiel development and extensive training. The Marine Corps will encounter mines used extensively against them throughout the battle area during offensive, defensive and rear area operations. The threat considers mines to be effective in the offense. Threat mechanized divisions have the capability to emplace 36km of minefield obstacles in a 24-hour period. Minefields emplaced to support offensive operations normally have an antitank mine density of 750 mines per kilometer of front. Minefield depths normally vary from 80m to 200.

(2) Threat use of mines in the defense is normally integrated into obstacle systems with mutually supporting strong points and fortified positions. Depending upon the time and material available, minefields used in the defense range from point obstacles to zones of obstacles and strong points extending for several kilommeters.

(3) Rear area Threat mining operations include emplacement of mines in and around command and control and logistic centers, on main supply routes, and (across) routes of advance. These are random mining operations designed to interdict, slow, and/or confuse enemy sustaining efforts.

b. Operational Deficiency

(1) To counter Threat mining operations, Marine Corps breaching devices currently include:

(a) The rocket propelled M58A1 linear demolition charge, a 3,100 Lb (1406.14kg) system designed for ground emplacement and employment. Personnel and material handling equipment are unnecessarily exposed to enemy covering fire when using this system because exposure times are long and there is no protection against direct or indirect fire. As orginially designed, the M58A1 line charge must be transported into firing position by a forklift, crane or truck before installation of an accessory launcher rail and assembly of the rocket firing connections. The M58A1 line charge will create an acceptable 16m wide, 100m long breached lane against single impulse pressure actuated antitank mines.

(b) Manual removal and conventional explosive techniqes are slow and suitable chiefly for situations where silence and deliberate breaches are needed.

(2) At the present time, the Marine Corps has no capability for a rapidly deployable device that provides a highly mobile, quick response capability for breaching operations.

3. OPERATIONAL AND ORGANIZATIONAL CONCEPT

a. Operational Concept. Mechanized infantry, armored and combat engineer units will employ the MICLIC system in response to assault minefield breaching requirements identified by the maneuver element commander.

(1) The MICLIC will be organic to combat engineer units.

(2) The line charges are prepared for firing by combat engineer personnel. Preparation will normally take place in a predetermined engineer assembly area. However, during mechanized operations, the MICLIC will be manuevered to be responsive to the needs of the maneuver element commander.

(3) The maneuver element conducting the minefield breach dispatches suitable tactical vehicles to pick up and transport the line charge trailer from the engineer assembly area to the point at which breaching operations are to be conducted.

(4) The MICLIC will be moved to the selected firing site and fired under control of the maneuver element commander. Additional line charges towed by other tactical vehicles may be fired from the breached lane depending upon the length of the minefield obstacle.

(5) Track-width mine plows attached to armored vehicles may be used to proof the breach made by the MICLIC.

(6) After firing, the empty trailer(s) may be carried behind the towing vehicle or quickly reloaded if additional breaching missions are anticipated. Otherwise, the trailers will be towed to a preselected position and dropped for later recovery by engineer units.

(7) Assembly of MICLIC's will be accomplished by personnel of combat engineer units using organic support vehicles with a lifting capability of 3100 pounds (1406.14 kilograms).

(8) Employment of MICLIC will normally be accomplished by combat engineer personnel attached to mechanized infantry and armored units. However, MICLIC may be employed by maneuver elements without direct engineer support.

b. Organizational Concept

(1) The MICLIC will be used by mechanized infantry, armored and combat engineer units for assault minefield breaching operations.

(2) Line charge trailers will be isssued to combat engineer platoons.

(3) The preparation of organic trailers will be accomplished by personnel from the unit/element transporting the system forward, assisted by engineer and supporting unit personnel. These personnel are to prepare the system, including the trailer, for employment, and check out the circuitry and component functions. Those personnel designated by the maneuver unit commander to transport/assemble the MICLIC system are also responsible for assisting in recovering organic trailers with unit transport after the MICLIC has been fired, to obtain new line charge kits, to assist in assembly, and to return with reusable trailers for further missions.

c. Training and Support Requirements. No additional skill requirements, personnel, or special training will be required for the system. Support requirements are discussed in detail in paragraph 7b.

4. ESSENTIAL CHARACTERISTICS

a. Operational Characteristics. The MICLIC system will:

(1) Produce a cleared lane with a minimum effective straight line length of at least 100m and a width of at least 10m.

(2) Upon detonation of the explosive, destroy, detonate, or otherwise neutralize at least 90 percent of all single impulse land mines and explosive booby traps in the cleared areas.

(3) Upon arriving at the firing point have a firing time sequence not to exceed 30 seconds.

(4) When in the operational mode, detonate no closer than 50m from the firing point (near end of explosive on the line charge).

(5) Function reliably when operated in or after storage in hot, and basic climatic areas as described in AR70-38. Climatic conditions are limited to +120°F (+48.9°C) to -25°F (-31.7°C) ambient temperature.

(6) Be capable of being towed on both improved and unimproved roads by standard tracked or wheeled vehicles of 5-ton size or larger at normal operating speeds.

(7) Have a manually operated firing control assembly which is capable of launching the rocket and firing the line charge from within the towing vehicle.

(8) Be capable of firing line charges successively using two or more systems, and have the paths created by these successive firings join to create an extended cleared lane.

(9) Be suitable for assembly and operation by the employing personnel in full NBC protective clothing or environmental clothing.

(10) Be operable, to include all functions, from within an armored vehicle without crew exposure. Sighting and aiming the line charge will be accomplished by aligning the tow vehicle and trailer in the direction of the intended breach.

(11) Be capable of being transported in a C-130 or larger aircraft, and externally air transportable by heavy lift rotary wing aircraft. It will also be capable of being transported by rail and sea, and will be equipped with appropriate lifting and tie-down points.

(12) Be capable of firing in smoke, haze, fog, clouds, and other battlefield obscurants.

(13) Have system design in accordance with Military Standards 1472B and 882 and other appropriate health hazard and safety standards.

(14) Have a maximum load/reload time for the trailer of be 15 minutes using 2 men and material handling equipment with a lift capability of 3100 lbs (1406.14kg) or more.

(15) The system will be capable of being employed and stored in hot and basic climatic areas in accordance with AR 70-38.

b. Reliability, Availability, and Maintainability (RAM)

(1) The reliability of the MICLIC system is the combination of the trailer reliability and the line charge reliability. The line charge reliability is the combination of the firing reliability and the detonation reliability. The Best Operational Capability (BOC) of the MICLIC shall be 0.84, and the Minimum Acceptable Value (MAV) over the life of the sytem shall be 0.79 probability of completing a 10 mile (16.09km) cross-country trip with one firing, and one detonation mission without an operational mission failure.

(2) The maximum time to repair (MTTR) shall be no greater than 0.5 hours at organizational level and 2.0 hours at the direct or general support level. The MTTR is defined as the 90th percentile of the repair times at the appropriate maintenance levels.

c. Nuclear Survivability

(1) Nuclear survivability is not required because the system can be replaced before its absence becomes critical to the battlefield commander.

(2) The system should be survivable in an electromagnetic pulse environment.

d. Non-Nuclear Survivability. The MICLIC system will be used with items which will enhance its survivbility on the battlefield, such as a smoke system for obscuring enemy visual observation; camouflage or pattern painting; and visual disruptors.

e. NBC Defense Hardening. This system will be painted with chemical agent resistant paint for ease of decontamination.

5. OTHER WARFARE AREAS CONCERNED. The introduction of this system will primarily affect Mission Area-215.1 (Combat). It will further impact on Mission Areas 211.2 (Armor), 211.4 (Combat Mobility), and 214.3 (Mine Countermeasures).

6. RELATED EFFORTS. The U.S. Army evaluated the British Giant Viper mine clearing line charge under the International Material Evaluation (IME) program to determine if it met a similar requirement. The Giant Viper was not found acceptable and was rejected as a candidate line charge system. The M58A1 Line Charge is also being adapted for a mine clearing line charge system for the LVTP-7A1 amphibious assault vehicle by the Marine Corps. This system will provide an amphibious assault mine clearing capability. The LVTP-7A1 mine clearing line charge system uses a differently configured pallet containing the M58A1 line charge and the MK22 rocket motor. This system was developed for mine clearing operations during amphibious assaults.

7. TECHNICAL FEASIBILITY, ENERGY-EFFECTIVENESS IMPACT, AND COST FORECAST

a. Technical Feasibility

(1) The M58A1 Linear Demolition Charge is a standard Marine Corps ordnance item and will satisfy safety and explosive clearing requirements. The M58A1 line charge was originally designed as a palletized, ground-positioned, surface-launched system. This design lacked mobility and required personnel exposure during minefield breaching operations. The M58A1 line charge and pallet weighs 3,200 lts (1451.49kg). The linear explosive charge is 350ft (106.68m) long and contains 1,750 lbs (793.79kg) of Composition C4 explosive. A 205ft (62.48m) nylon arresting cable anchors the line charge to the pallet container after the line charge is deployed. The M58A1 line charge is command detonated by means of an electrical firing circuit through the pallet, arresting cable and electric fuze. Safety systems are built into the circuitry and fuze to prevent premature detonation until the line charge is fully deployed. The M58A1 line charge will create a breach path approximately 100m long and 10-16m wide against tactically laid, single-impulse pressure mines.

(2) The MK 22 rocket used to deploy the M58A1 line charge is in the Marine Corps ordnance inventory. Current rocket stocks will require propellant regraining and electromagnetic interference filters for increased reliability, effectiveness, and safety. The MK22 rocket is an acceptable line charge rocket, and the technical risks of completing required modifications and changes are low.

(3) The M353 general purpose, 3 1/2-ton, chassis trailer is an existing asset that can easily be adapted to carry the M58A1 line charge. This trailer can be towed by standard U.S. wheeled and tracked vehicles. The carrying capacity of the trailer is adequate. Design and features of the trailer allow for land, sea and air transport. RAM is established since this trailer is a standard equipment asset. There is a low risk involved in combining the M353 trailer and the M58A1 line charge as a mobile mine clearing system.

(4) A launch rail and framework will be required to launch the MK22 rocket and carry the M58A1 line charge pallet on the M353 trailer chassis. The launch rail will have the capability to be raised remotely to a desired launch angle from within the towing vehicle. The launch rail will be designed to carry the MK22 rocket prepared and assembled for firing during cross-country movement. Both devices can be developed with available technology at low risk.

(5) The adaptation of existing ordnance and trailer assets will satisfy many of the basic requirements. This approach is low risk.

b. Logistic/Manpower Assessment. Adding a trailer mounted line charge system to Fleet Marine Force units will increase the logistics requirements for added Class VII items. Class VII items include trailer chassis and launch rail frames. Additional Class V stocks of line charges and rockets will be needed for unit training and contingency operations.

(1) Resupply. After a breaching mission, the empty trailers will be re-equipped with new rockets and line charges drawn from the ammunition supply area (ASA) to make a complete system ready for another mission.

(2) Maintenance

(a) Operator and Organizational Maintenance. Operator services will be performed by engineer and vehicle crew personnel associated with employing vehicles, including assembly and check out of all components. From the assembly area to the mission firing site, the only maintenance required will be a circuit continuity check performed by the crew of the employing vehicle when the trailer and electrical cables are hooked to the towing vehicle. After firing the line charge, the using unit is responsible for retrieving organic trailers and obtaining a new set of expendable ordnance components. The trailers will be maintained by unit mechanics.

(b) Direct Support/General Support. Class V ordnance components will be inspected and maintained in accordance with current instructions. Maintenance of the trailer and the launch rail kit will be performed under the existing maintenance system.

(3) Training Assessment. Training materials will be provided by the material developer to support the M58A1 line charge trailer mounted system. Standard ordnance items will be provided from Class V stocks. Trailers will be furnished from equipment stocks held at Marine Corps logistic bases. Technical Manuals (TMs) currently in existance for Class V and VII items will be used as the basis for all training manuals and materials. Additional information and material required to support operational testing of the system will be published and provided by the Marine Corps Development and Education Command. A new and approved TM on the MICLIC system will be prepared from all approved elements of the training support package. A training support package for individual and collective training will be available to meet system IOC.

(4) Manpower/Force Structure Assessment. The MICLIC system will be used by combat engineer, mechanzed infantry, and armored units. It is anticipated that currently existing combat engineers can support the system. There will be no special MOS required for assembly, employment, and maintenance of the MICLIC. No additional personnel will be required to introduce

the MICLIC system into the force structure. Preparation of the MICLIC system for firing will require special training. MICLIC systems will be issued to reserve units.

c. Energy-Effectiveness Impact. The MICLIC will have no impact on energy consumption or savings.

d. Cost Forecast

Research and Development: $300,000-350,000

Total Investment Cost

Recurring

M58A1 Line Charge	$15,676
M68A1 Line Charge	14,876
MK22 Mod 2 Rocket	4,431

Nonrecurring

M353 Trailer Chasis	$ 4,702
Launcher Rail Kit	11,600